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EXAMINER	
OVEISSI, DAVID M	
ART UNIT	**PAPER NUMBER**
2416	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/801,624	KADOUS, TAMER	
	Examiner	Art Unit	
	DAVID OVEISSI	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19,21-24 and 26-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-10,12-19,21,23,24,26-29,31 and 33-38* is/are rejected.

7)☐ Claim(s) *2-4, 11, 22, 32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Claims 20, 25, and 30 have been cancelled.

1. Applicant's arguments with respect to claims 1, 10, and 13 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 10, and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1, 10, and 13 the limitation "transmitting multiple of the data packets in an interlaced manner" is vague and indefinite because it does not specify what the intention of the limitation is. In addition, there is no antecedent for the phrase "transmitting multiple of said data packets in an interlaced manner".

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 5- 7, 10, and 12-13 are rejected as being unpatentable over Piiraninen (US 7,031,419 B2) in view of Ebert et al. (US 7,155,171B2).

For claims 1, 10, and 13 Piiraninen teaches a method/transmitter/apparatus method of performing incremental redundancy (IR) transmission in a wireless multiple-input multiple-output (MIMO) communication system (see column 3 lines 2-27 “MIMO”), comprising:

processing a data packet to obtain a plurality of symbol blocks for the data packet (see abstract and column 2 lines 24-66 “dividing the symbols to be transmitted into blocks between transceivers”);

transmitting a first symbol block from a plurality of transmit antennas at a transmitter to a plurality of receive antennas at a receiver, wherein the first symbol block is one of the plurality of symbol blocks;

transmitting remaining ones of the plurality of symbol blocks, one symbol block at a time, until the data packet is recovered correctly by the receiver or all of the plurality of symbol blocks are transmitted (see abstract Fig. 3 “308a & 308b”); and

Piiraninen does not teach transmitting multiple of the data packets in an interlaced manner limitation. However, Ebert from the same field of endeavor teaches this limitation (see column 1 lines 62-64 “interlace”, column 6 lines 6-9, column 10 lines 34, and column 11 line 1-4 “interlace”). Thus, it would have been obvious to the person of ordinary skill in the art at time of invention to use the interlaced system of Ebert in the MIMO system of Piiraninen. This combination is possible because Piiraninen’ MIMO system uses multiplexing mechanism to combine many blocks of symbols for transmission and reception. The multiplex mechanism can be modified to behave as an interlacing mechanism. The motivation for this combination is provide efficiency using a shared medium.

For claim 5 **Piirainen** teaches a method, further comprising: receiving a negative acknowledgment (NAK); and transmitting a next symbol block among the remaining ones of the plurality of symbol blocks in response to receiving the NAK *(see Fig.4 “432 & 414).*

For claim 6 **Piirainen** teaches a method, wherein the MIMO system utilizes orthogonal frequency division multiplexing (OFDM), and wherein each of the plurality of symbol blocks is transmitted from a plurality of subbands of the plurality of transmit antennas, if at all *(see Column 4 line 18-19)*.

For claim12 **Piirainen** teaches a transmitter, further comprising:

a transmit spatial processor operative to receive a symbol block to be transmitted and provide symbols in the symbol block to the plurality of transmit antennas *(see column 10 lines 55-60).* The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

3. Claims 15-19, 21, 23-24, 26-29, and 31-38 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kim (US 20040114691 A1) in view of Piitainen (US 7,031,419 B2).

For claims 15, 22-23, and 26 **Kim** teaches a method/receiver/apparatus of receiving an incremental redundancy (IR) transmission in a wireless multiple-input multiple-output (MIMO) communication system, comprising:

obtaining a block of detected symbols for a data packet, wherein the detected symbol block is an estimate of a data symbol block transmitted from a plurality of transmit antennas at a transmitter and received by a plurality of receive antennas at a receiver, and wherein the data symbol block is one of a plurality of data symbol blocks generated for the data packet *(see paragraphs 11, 12, 14, 16, 107, 108,110, 151, 216, 235, 260, and 261)*;

decoding all detected symbol blocks obtained for the data packet to provide a decoded packet *(see Fig. 11 "Post-Processor & detector", Fig. 12 "inverse Fourier*

Transformer & detector", Fig. 17 flowchart, and Fig. 31 Flowchart"); determining whether the decoded packet is correct or in error *(see paragraphs 224 and 248)*; and

repeating the obtaining, decoding, and determining for another one of the plurality of data symbol blocks if the decoded packet is in error (see Fig. 7 flowchart , Fig. 10 flowchart *and paragraph 10*).

obtaining channel estimates (see paragraphs 28, 117, 282, and 289 (channel estimation and channel estimation detector values"); and

selecting, based on the channel estimates a rate for data transmission (see paragraph 5 transmission rate) on the MIMO channel.

Kim does not teach for a MIMO channel between the plurality of transmit antennas and the plurality of receive antennas. However, Piirainen from the same field of endeavor teaches this limitation (see column 9 lines 52-58 " "the MIMO transmission rate when the S/N is good"). Thus, it would have been obvious to the person of ordinary skill in the art at time of invention to use the MIMO system of Piirainen in the OFDM system of Kim. This combination is possible because it is configuring the Kim system to address multiple input and output channels. The motivation for this combination is to enhance OFDM capacity over multiple input and output channels.

For claim16 **Kim** teaches a method, further comprising:

obtaining a block of received symbols for the data symbol block; and

detecting the received symbol block to obtain the detected symbol block *(see Fig. 10 flowchart and paragraph 10).*

For claim17 **Kim** teaches a method, wherein the detecting is based on a minimum mean square error (MMSE) detector, a maximal ratio combining (MRC) detector, or a linear zero-forcing (ZF) detector *(see paragraphs 77, 224, 248, 227, and 251)*.

For claim18 **Kim** teaches a method, further comprising:

terminating the obtaining, decoding, and determining if the decoded packet is correct or if the plurality of data symbol blocks for the data packet have been transmitted *(see paragraphs 224 &248)*.

For claim19 **Kim** does not teach a method, further comprising:

sending an acknowledgment (ACK) for the data symbol block if the decoded packet is correct or a negative acknowledgment (NAK) if the decoded packet is in error. However, **Piirainen** from the same field of endeavor teaches this limitation *(see F.4 flowchart "432 & 414").* Thus, it would have been obvious to person of ordinary skills in the art at the time of invention to use the MIMO system of Piirainen in the OFDM system of Kim. The rational for this combination is to provide feedback for retransmission.

For claim 21 **Kim** teaches a method, wherein the selecting includes

deriving a signal-to-noise-and-interference ratio (SNR) estimate for each of the plurality of transmit antennas *(see paragraphs 224, 225, and 228)*,

determining an average spectral efficiency for the plurality of transmit antennas based on SNR estimates for the plurality of transmit antennas *(see paragraphs 224, and 225)*, and

determining the rate based on the average spectral efficiency for the plurality of transmit antennas *(see paragraphs 5 and 6)*.

For claim 24 **Kim** teaches a receiver further comprising:

a detector operative to obtain a block of received symbols for the data symbol block and to detect the received symbol block to obtain the detected symbol block *(see Fig. 30 "detector").*

For claim 27 Kim teaches an apparatus, further comprising:

means for obtaining a block of received symbols for the data symbol block; and means for detecting the received symbol block to obtain the detected symbol block *(see Fig. 30 "detector")*.

For claims 28, 29, and 33-35 Kim teaches a method/receiver/apparatus of receiving an incremental redundancy (IR) transmission in a wireless multiple-input multiple-output (MIMO) communication system, comprising:

receiving a block of received symbols for a data packet, wherein the received symbol block is for a data symbol block transmitted from a plurality of transmit antennas at a transmitter and received by a plurality of receive antennas at a receiver, and wherein the data symbol block is one of a plurality of data symbol blocks generated for the data packet *(see paragraphs 11, 12, 14, 16, 110, 114, 151, 155, 160, 216, 220, 235, and 239)*;

detecting all received symbol blocks received for the data packet to obtain detected symbol blocks, one detected symbol block for each received symbol block *(see paragraphs 11, 12, 14, 16, 110, 114, 151, 155, 160, 216, 220, 235, and 239)*;

decoding the detected symbol blocks for the data packet to obtain decoder feedback information*(see paragraphs 11, 12, 14, 16, 110, 114, 151, 155, 160, 216, 220, 235, and 239)*;

performing the detecting and decoding for a plurality of iterations, wherein the decoder feedback information from the decoding for a current iteration is used by the detecting for a subsequent iteration*(see paragraphs 11, 12, 14, 16, 110, 114, 151, 155, 160, 216, 220, 235, and 239)*; and

generating a decoded packet based on an output from the decoding for a last iteration among the plurality of iterations*(see paragraphs 11, 12, 14, 16, 110, 114, 151, 155, 160, 216, 220, 235, and 239)*.

obtaining channel estimates (see paragraphs 28, 117, 282, and 289 (channel estimation and channel estimation detector values"); and

selecting, based on the channel estimates a rate for data transmission (see paragraph 5 transmission rate) on the MIMO channel. Kim does not teach for a MIMO channel between the plurality of transmit antennas and the plurality of receive antennas. However, Piirainen from the same field of endeavor teaches this limitation (see column 9 lines 52-58 " "the MIMO transmission rate when the S/N is good"). Thus, it would have been obvious to the person of ordinary skill in the art at time of invention to use the MIMO system of Piirainen in the OFDM system of Kim. This combination is possible because it is configuring the Kim system to address multiple inputs and output channels. The motivation for this combination is to enhance OFDM capacity over multiple inputs and output channels.

For claim 31 **Kim** teaches a method, wherein the detecting is based on a minimum mean square error (MMSE) detector, a maximal ratio combining (MRC) detector, or a linear zero-forcing (ZF) detector (*(see paragraph 77).*

For claim 32 **Kim** teaches a method, wherein the MMSE detector is used for the detecting for N iterations and the MRC detector or the ZF detector is used for the detecting after N iterations, where N is one or greater*(see paragraph 77)*.

For claim 36 **Kim** teaches an apparatus of claim 35, further comprising: means for determining whether the decoded packet is correct or in error; and means for repeating the receiving, detecting, decoding, performing, and generating for another one

of the plurality of data symbol blocks if the decoded packet is in error and all of the plurality of data symbol blocks have not been transmitted *(see paragraphs 224 & 248)*.

For claim 37 **Kim** teaches a method of receiving a data transmission in a wireless multiple-input multiple-output (MIMO) communication system, comprising:

detecting received symbols for a data packet to obtain detected symbols *(see paragraphs 11,12, 14, 16, 110, 114, 118, 137, 141, 151, 155, 160, 216, 235, and 239- estimated values are interpreted as feedback information, Pre-Processor & Symbol Extractor are interpreted as decoder)* ;

decoding the detected symbols to obtain decoder feedback information*(see paragraphs 11,12, 14, 16, 110, 114, 118, 137, 141, 151, 155, 160, 216, 235, and 239- estimated values are interpreted as feedback information, Pre-Processor & Symbol Extractor are interpreted as decoder)*;

performing the detecting and decoding for a plurality of iterations, wherein the decoder feedback information from the decoding for a current iteration is used by the detecting for a subsequent iteration, wherein the detecting is performed based on a minimum mean square error (MMSE) detector for first N iterations, where N is one or greater, and based on a maximal ratio combining (MRC) detector or a linear zero-forcing (ZF) detector for remaining ones of the plurality of iterations (see paragraphs 77, 224, 227, 247, and 251- MMSE, ZF, and N) ; and

generating a decoded packet based on an output from the decoding for a last iteration among the plurality of iterations*(see paragraphs 11,12, 14, 16, 110, 114, 118,*

137, 141, 151, 155, 160, 216, 235, and 239- estimated values are interpreted as feedback information, Pre-Processor & Symbol Extractor are interpreted as decoder).

obtaining channel estimates (see paragraphs 28, 117, 282, and 289 (channel estimation and channel estimation detector values"); and

selecting, based on the channel estimates a rate for data transmission (see paragraph 5 transmission rate) on the MIMO channel. Kim does not teach for a MIMO channel between the plurality of transmit antennas and the plurality of receive antennas. However, Piirainen from the same field of endeavor teaches this limitation (see column 9 lines 52-58 " "the MIMO transmission rate when the S/N is good"). Thus, it would have been obvious to the person of ordinary skill in the art at time of invention to use the MIMO system of Piirainen in the OFDM system of Kim. This combination is possible because it is configuring the Kim system to address multiple inputs and output channels. The motivation for this combination is to enhance OFDM capacity over multiple inputs and output channels.

For claim 38 **Kim** teaches a method, wherein N is equal to one *(see paragraph 77)*.

Allowable Subject Matter

4. Claims 2-4, 7-9, 11, and 22 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Walton et al. (US 2004/0081131 A1) and Onggosanusi et al. (US 7,133,459 B2) are all cited to show systems, which are considered pertinent to the invention.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID OVEISSI whose telephone number is (571)270-3127. The examiner can normally be reached on Monday to Friday 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ricky Ngo/
Supervisory Patent Examiner, Art Unit 2416

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